

We claim:

5 *Sub B1*

1. A coated substrate comprising a substrate coated on at least one side with a continuous layer of a pressure-sensitive adhesive having a microstructured surface, wherein the microstructured surface comprises a series of features and wherein the lateral aspect ratio of the features range from about 0.1 to about 10.

10 2. The coated substrate of claim 1 wherein each of the features has a shape selected from the group consisting of hemispheres, prisms, pyramids, ellipses, and grooves.

3. The coated substrate of claim 1 wherein the substrate is selected from the group consisting of backings and release liners.

15 *5 4.* The coated substrate of claim 1 wherein the lateral aspect ratio of the features range from about 0.2 to about 5.

20 *6 5.* The coated substrate of claim 1 wherein the spacing aspect ratio of the features range from about 1 to about 1.9.

25 *7 6.* The coated substrate of claim 1 wherein the spacing aspect ratio of the features ranges from about 1 to about 1.5.

8 7. The coated substrate of claim 1 wherein the spacing aspect ratio of the features ranges from about 1 to about 1.1.

30 *9 8.* The coated substrate of claim 1 wherein the pressure-sensitive adhesive comprises a thermoplastic block copolymer adhesive.

10 ~~9~~. The coated substrate of claim ~~8~~⁹ wherein the thermoplastic block copolymer adhesive is selected from the group consisting of styrene-isoprene-styrene, styrene-butadiene-styrene, and styrene-ethylene/butylene-styrene block copolymers.

11 ~~10~~. The coated substrate of claim 1 wherein the pressure-sensitive adhesive comprises an acrylic polymeric pressure-sensitive adhesive modified with a polymeric segment(s) having glass transition temperature(s) higher than about 20°C.

12 ~~11~~. The coated substrate of claim 1 wherein said backing is selected from the group consisting of poly(propylene), poly(ethylene), poly(vinyl chloride), polyester, polyamide, cellulose acetate, ethyl cellulose, woven fabric, nonwoven fabric, metal, metallized polymeric film, and ceramic sheet materials.

12. The coated substrate of claim 1 wherein each feature has a height of about 2.5 to about 375 micrometers.

13 ~~13~~. The coated substrate of claim 1 wherein each feature has a height of about 25 to about 250 micrometers.

14 ~~14~~. The coated substrate of claim 1 wherein each feature has a height of about 25 to about 125 micrometers.

15. ~~The coated substrate of claim 1 wherein three dimensions of each feature are microscopic.~~

16. A method of making a microstructured pressure-sensitive adhesive tape comprising the steps of:

(a) providing a microstructured molding tool;

(b) embossing an adhesive layer of an adhesive tape comprising a backing coated with a continuous layer of an embossable pressure-sensitive adhesive with the microstructured molding tool, wherein the pressure-sensitive adhesive layer is capable of assuming the pattern of the microstructured molding tool and retaining a microstructured surface upon removal from the microstructured molding tool; and

(c) separating the microstructured molding tool and the adhesive layer to form a microstructured pressure-sensitive adhesive tape.

17. The tape made according to the method of claim 16.

18. A method of making a microstructured pressure-sensitive adhesive tape comprising the steps of:

(a) providing a microstructured molding tool;

(b) coating a pressure-sensitive adhesive layer against the microstructured molding tool, wherein the pressure-sensitive adhesive layer is capable of assuming the pattern of the microstructured molding tool and retaining the microstructured pattern upon removal from the microstructured molding tool;

(c) applying a backing to the surface of the pressure-sensitive adhesive layer which is in contact with the microstructured molding tool; and

(d) separating the microstructured molding tool and the adhesive layer to form a microstructured pressure-sensitive adhesive tape.

19. The tape made according to the method of claim 18.

20. A method for making a microstructured pressure-sensitive adhesive tape comprising the steps of:

(a) providing a microstructured backing having a pressure-sensitive adhesive releasing microstructured side and a planar side having less release character than the microstructured side;

(b) coating a pressure-sensitive adhesive layer on the microstructured side of the backing;

(c) adhering the surface of the pressure-sensitive adhesive layer which is in contact with the microstructured backing to the planar side of the microstructured backing; and

(d) removing the microstructured side of the backing from the microstructured surface of the adhesive layer to form a microstructured pressure-sensitive adhesive tape.

21. The tape made according to the method of claim 20.

22. A method for making a microstructured pressure-sensitive adhesive tape comprising the steps of:

(a) providing a microstructured backing having a pressure-sensitive adhesive releasing microstructured side and a planar side having less release character than the microstructured side;

(b) coating an embossable pressure-sensitive adhesive layer on the planar side of the backing;

(c) contacting the surface of the pressure-sensitive adhesive layer which is in contact with the microstructured backing with the microstructured side of the backing to emboss the adhesive layer; and

(d) separating the microstructured backing and the adhesive layer to yield a microstructured pressure sensitive adhesive tape.

23. The tape made according to the method of claim 22.

24. A method of making a microstructured pressure-sensitive adhesive transfer coating comprising the steps of:

(a) providing a microstructured molding tool;

(b) embossing an adhesive layer of an adhesive transfer coating comprising a release liner coated with a continuous layer of an

embossable pressure-sensitive adhesive with the microstructured molding tool, wherein the pressure-sensitive adhesive layer is capable of assuming the pattern of the microstructured molding tool and retaining a microstructured surface upon removal from the microstructured molding tool; and

5 (c) separating the microstructured molding tool and the transfer coating to form a microstructured pressure-sensitive adhesive transfer coating.

25. The transfer coating made according to the method of claim 24.

10 26. A method of making a microstructured pressure-sensitive adhesive transfer coating comprising the steps of:

(a) providing a microstructured molding tool;
(b) coating a pressure-sensitive adhesive layer against the microstructured molding tool, wherein the pressure-sensitive adhesive layer is capable of assuming the pattern of the microstructured molding tool and retaining the microstructured pattern upon removal of the microstructured molding tool;

15 (c) applying a release liner to the surface of the pressure-sensitive adhesive layer which is in contact with the microstructured molding tool; and

20 (d) separating the microstructured molding tool and the adhesive layer to form a microstructured pressure-sensitive adhesive transfer coating.

25 27. The transfer coating made according to the method of claim 26.

28. A method of making a microstructured pressure-sensitive adhesive transfer coating comprising the steps of:

30 (a) providing a first release liner coated with a continuous layer of an embossable pressure-sensitive adhesive; and

(b) embossing the surface of the pressure-sensitive adhesive layer which is in contact with the first release liner with a microstructured second release liner to form a microstructured pressure-sensitive adhesive transfer coating.

29. The transfer coating made according to the method of claim 28.

30. A method of making a microstructured pressure-sensitive adhesive transfer coating comprising the steps of:

(a) providing a microstructured liner having a microstructured side and a planar side, both sides having release characteristics;

(b) coating a pressure-sensitive adhesive layer on the microstructured side of the liner;

(c) adhering the surface of the pressure-sensitive adhesive layer which is not in contact with the microstructured liner to the planar side of the microstructured liner; and

(d) removing both the microstructured side and planar side of the liner from the adhesive layer to form a microstructure pressure-sensitive adhesive transfer coating.

31. The transfer coating made according to the method of claim 30.

16 ~~32~~. The coated substrate of claim 1 wherein the pressure-sensitive adhesive comprises a radiation curable acrylate pressure-sensitive adhesive.

17 ~~33~~. The coated substrate of claim 1 wherein the pressure-sensitive adhesive is a temporarily repositionable adhesive.

18 ~~34~~. The coated substrate of claim 1 wherein the pressure-sensitive adhesive is a permanently repositionable adhesive.

Sub
B3

35. The coated substrate of claim 1 wherein the pressure-sensitive adhesive is a self-debonding adhesive.

5

20 36. The coated substrate of claim 1 where the pressure-sensitive adhesive is selected from the group consisting of organic solvent based acrylics, waterborne acrylics, silicone adhesives, natural rubber based adhesives, and thermoplastic resin based adhesives.

ADD B4

add
C1

52